

CLAIMS

1. A heater pipe interposed between an engine and a heater for circulating the engine cooling fluid through the heater, comprising:

5 an inner pipe for causing said engine cooling fluid to flow into said heater; and

an outer pipe arranged on the outer periphery of said inner pipe for causing the engine cooling fluid having heated the air-conditioning air in  
10 said heater to flow out of said heater.

2. A heater pipe according to claim 1,  
wherein said inner pipe and said outer pipe are arranged substantially coaxially.

3. A heater pipe according to claim 1, comprising  
15 a plurality of joints each including the inner peripheral chamber of said inner pipe, the outer peripheral chamber of said outer pipe arranged on the outer periphery of said inner peripheral chamber, a first branch joint  
portion communicating with said inner peripheral chamber,  
20 and a second branch joint portion communicating with said outer peripheral chamber and arranged independently of said first branch joint portion.

4. A heater pipe according to claim 3,  
wherein said inner peripheral chamber and  
25 said first branch joint portion are arranged substantially linearly, and

wherein said outer peripheral chamber and said second branch joint portion are arranged with an intersection angle of more than 90 degrees between the  
30 axial lines thereof.

5. A heater pipe according to claim 3,  
wherein said first branch joint portion and said second branch joint portion are arranged substantially in parallel to the axial direction of the  
35 joints.

6. A heater pipe comprising:  
a pipe unit including an inner pipe

causing the engine cooling fluid to flow into a heater,  
and an outer pipe causing the engine cooling fluid,  
having heated the air-conditioning air in said heater, to  
flow out of said heater;

5                   a joint unit including an inner peripheral  
chamber connected to said inner pipe, an outer peripheral  
chamber arranged on the outer periphery of said inner  
peripheral chamber and connected to said outer pipe, a  
first branch joint portion communicating with said inner  
10 peripheral chamber, and a second branch joint portion  
communicating with said outer peripheral chamber and  
arranged independently of said first branch joint  
portion; and

                  an inner peripheral seal unit arranged  
15 between said inner pipe and said inner peripheral  
chamber; and

                  an outer peripheral seal unit arranged  
between said outer pipe and said outer peripheral  
chamber;

20                   wherein said pipe unit includes a pipe-  
side engaging portion, and said joint unit includes a  
joint-side engaging portion, so that said pipe unit and  
said joint unit are connected to each other by one action  
by engaging said pipe-side engaging portion and said  
25 joint-side engaging portion each other.

7. A heater pipe according to claim 6,

                  wherein said inner peripheral chamber and  
said outer peripheral chamber are partitioned by a  
partitioning wall integrated with said joint unit.

30                   8. A heater pipe according to claim 6,

                  wherein said inner peripheral chamber and  
said outer peripheral chamber are partitioned by said  
inner pipe.

9. A heater pipe according to claim 6,

35                   wherein at least one of said inner  
peripheral seal unit and said outer peripheral seal unit  
is arranged in such a position as not to reduce the cross

sectional area of the flow path of said engine cooling fluid.

10. A heater pipe according to claim 6,  
wherein at least one of said inner  
5 peripheral seal unit and said outer peripheral seal unit is held in an axial direction between said pipe unit and said joint unit by the engaging force of said pipe-side engaging portion and said joint-side engaging portion.

11. A heater pipe according to claim 6,  
10 wherein said joint-side engaging portion is formed integrally with said joint unit.

12. A heater pipe according to claim 6,  
wherein said joint-side engaging portion  
and said pipe-side engaging portion are arranged in such  
15 a position as to suppress the reduction in the sealing force of said outer peripheral seal unit which otherwise might occur due to the engagement of said joint-side engaging portion and said pipe-side engaging portion.

13. A heater pipe according to claim 6,  
20 wherein said joint-side engaging portion is an engaging hook arranged on the outer peripheral surface of the outer wall surrounding said outer peripheral chamber,

wherein said pipe-side engaging portion is  
25 an annular rib arranged around the outer peripheral surface of said outer pipe, and

wherein said pipe unit and said joint unit are connected to each other by one touch with said engaging hook engaging said annular rib.

14. A heater pipe according to claim 6,  
30 wherein at least one of the members making up the connecting portion between said outer pipe and said outer peripheral chamber and the connecting portion between said inner pipe and said inner peripheral chamber has a tapered portion to facilitate the positioning of  
35 the heater pipe and the joint at the time of connection thereof.